REMARKS/ARGUMENTS

Claim 1 is pending. Claim 1 has been rejected. Claim 1 has been amended. Reconsideration of this application in light of the following remarks is courteously solicited.

Rejection under 35 U.S.C. §103(a)

The Examiner asserts claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Christodoulides et al.

Applicants' amended independent claim 1 recites the following:

> "1. (currently amended) A high density magnetic recording medium using a FePtC thin film, which comprises an information recording unit and an information storing unit to magnetically record information using the information recording unit, wherein the information storing unit comprises a FePtC thin film manufactured by simultaneously depositing iron (Fe), platinum (Pt), and carbon (C) on a substrate, and said FePtC thin film contains 25 volume % carbon, a coercivity of 4.4 kOe, a grain size of 5 nanometers to 5.2 nanometers, and a uniform grain size distribution."

In accordance with the present invention, when the FePtC thin film contains 25 volume % carbon, the advantages of the present invention are achieved in that the coercivity of the thin film is 4.4 kOe, the grain size of the thin film is 5 nm to 5.2 nm and its grain size distribution is uniform thereby allowing the thin film to be suitable for a magnetic record. It is respectfully submitted that Applicants' amended independent claim 1 patentably defines over the Christodoulides et al. reference.

Christodoulides et al. does not disclose the claimed volume percent of carbon and properties present in the FePtC layer as recited in Applicants' amended independent claim 1. Further,

Christodoulides et al. discloses a multi-layer thin film including FePt and carbon, and its structural and magnetic properties. According to Christodoulides et al., the change of coercivity and fine structure of the multi-layer thin film is observed when a carbon content in the multi-layer thin film is varied. However, this technology is disadvantageous in that the multi-layer thin film is heat-treated at a relatively high temperature of 700°C after a deposition process, and the high temperature causes various problems in a process of producing the multi-layer thin film.

Another disadvantage of Christodoulides et al. is that the noise of a magnetic recording medium including the multi-layer thin film is increased because the multi-layer thin film has a large grain size, a nonuniform FePt grain size distribution, and also, the noise of the magnetic recording medium is increased because the squareness ratio is only 0.5-0.82.

The Examiner contends Christodoulides et al. teaches that magnetic isolation of the FePt and media noise can be controlled by adjusting the amount of carbon in the system. In one example, Christodoulides et al. teaches creating a FePtC thin film having a carbon thickness of 3Å, a grain size of 6.6 nm, a nonuniform FePt grain size distribution, a coercivity of 8819 kOe and a squareness ratio of 0.82. Christodoulides et al. does not achieve a smaller grain size or uniform grain distribution, and fails to achieve favorable microstructural properties. In another example, Christodoulides et al. teaches creating a FePtC thin film having a carbon thickness of 10, a uniform FePt grain size distribution, a coercivity of 3515 kOe, and a squareness ratio of 0.5. Christodoulides et al. achieves a uniform grain distribution but consequently fails to achieve favorable magnetic properties.

When examining the experimental results taught by

Christodoulides et al., Christodoulides et al. in turn supports Applicants' position that it is difficult for one of ordinary skill in the art to adjust the volume of carbon in order to achieve the magnetic isolation of the FePt and control media noise. Christodoulides et al. fails to concurrently improve both the microstructure and magnetic properties of the FePtC thin film and fails to provide any examples or experimental results to support the Examiner's position. In contrast, Applicants' claim 1 sets forth a high density magnetic recording medium that exhibits both the desired microstructure and magnetic property.

Accordingly, the present invention as claimed has been made keeping in mind the above problems occurring in Christodoulides et al. There are distinct structural differences in both microstructure and magnetic properties when comparing the present invention and Christodoulides et al. When the FePtC thin film contains 25 volume % carbon, the present invention is advantageous in that the coercivity of the FePtC thin film is 4.4 kOe, the grain size of the FePtC thin film is 5.2 nm, and its grain size distribution is uniform, thus the FePtC thin film suitable to the magnetic record is secured. In addition, the noise of the magnetic recording medium is reduced as the squareness ratio is approximately 1 (refer to [0007] of the specification of the present invention). Christodoulides et al. does not disclose the specific structure (in particular, 25 volume % carbon contained in FePtC thin film) and said effect of Applicants' amended independent claim 1.

Applicants have disclosed too that when FePt thin film does not contain carbon, the FePt grain size is 10nm to 20nm and the FePt grain distribution is non-uniform (Applicants' specification, page 8, lines 10-12). As carbon content increases from 0 volume% to 25 volume%, the FePt grain size

decreases and exhibits uniform distribution (Id., page 8, line 7 through page 10, line 1). As shown in FIGS. 3B, 3C and 4, however, the coercivity is not satisfied for the magnetic record (Id.). When the volume% carbon exceeds 25%, the squareness ratio falls below 1, which is exactly what Christodoulides teaches in his examples.

Applicants' amended independent claim 1 recites in part an FePtC thin film containing "25 volume % carbon, a coercivity of 4.4 kOe, a grain size of 5 nanometers to 5.2 nanometers, and a uniform grain size distribution", which is not taught by Christodoulides et al. Applicants' claimed FePtC thin film exhibits a squareness ratio of almost 1, a coercivity of 4.4 kOe, a FePt grain size as small as 5nm, and a uniform FePt grain distribution. Christodoulides et al. does not teach and cannot successfully suggest or motivate one of ordinary skill in the art to adjust the carbon level to achieve the high density magnetic recording medium recited in Applicants' independent claim 1. The examples provided by Christodoulides et al. demonstrate Christodoulides et al. cannot successfully adjust the carbon level to achieve the high density magnetic recording medium recited in Applicants' amended independent claim 1.

In light of the foregoing, it is respectfully submitted that claim 1 is patentable over the cited Christodoulides et al. reference and an early indication of same is respectfully requested.

CONCLUSION

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claim patentably defines over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,
Sung-Chul Shin et al.

By______________________

Ross J. Christie
Attorney for Applicants
Reg. No. 47,492
Tel: (203) 777-6628 x.116
Fax: (203) 865-0297

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I, Ross Christie, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on December 26, 2006

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Ross J. Christie